Scan QR Code For More Information

MULTILAYER VARISTORS

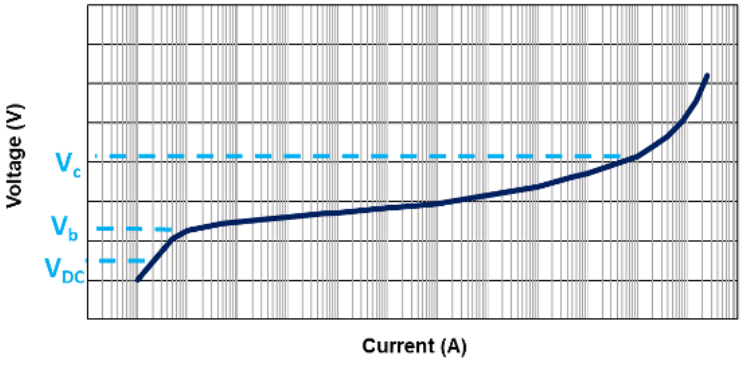
QUICK GUIDE

WHAT IS A MULTILAYER VARISTOR (MLV)?

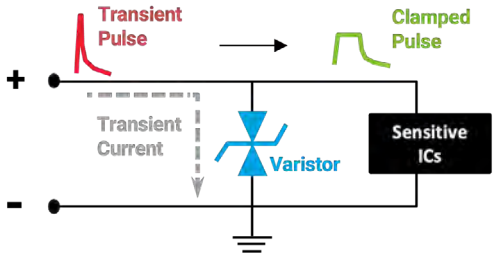
KYOCERA AVX Multilayer Varistors (MLVs) provide reliable protection against transient requirements seen in applications such as Load Dump, Jump Start, ESD, along with Communication Protocols such as USB and CAN to protect the growing number of electronic systems used in a wide range of markets. KAVX has solutions for Commercial products and devices that are AEC-Q200 qualified.

With a similar internal structure to a Multilayer Ceramic Capacitor (MLCC), the Varistor can evenly distribute and dissipate incoming ESD events and other transients. As shown below, When one of these events occurs, the varistor will begin conducting at its breakdown voltage (Vb) and once the voltage reaches the varistor's specified clamping voltage (Vc), it will clamp transient pulses that exceed this limit. The transient energy is then shunted to ground in the same manner as when using a TVS Diode.

Typical MLV VI Curve



HOW THE MLV WORKS



WHERE TO USE A MULTILAYER VARISTOR?

Automotive & Transportation
- CAN Modules
- EV Charging
- Infotainment
- I/O Ports

Communication
- GPS
- Ethernet & USB
- Radios
- RFID

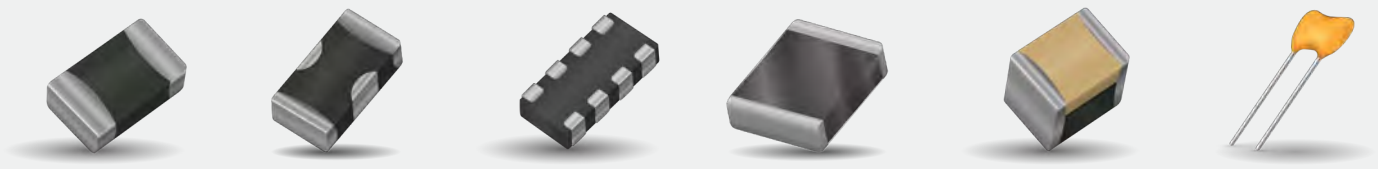
Consumer & Commercial
- Touchscreens
- HDMI
- Computers
- Appliances

Energy & Lighting
- LED Lighting
- Smart Meters
- Control Panels
- DC Motors

Military
- Sensors
- Radars
- Datalinks
- High Temperatures

And Much More!

Any Human to Machine or Machine to Machine interaction points



MULTILAYER VARISTORS

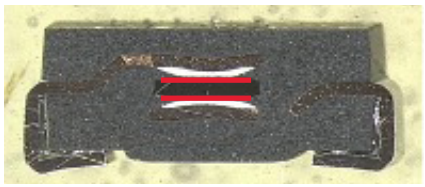
KYOCERA AVX MULTILAYER VARISTORS VS. TVS DIODES

When comparing the internal structure of a MLV against a TVS diode, both components will dissipate energy in the P-N junction region (indicated in red on both devices). TVS diodes will only have a single P-N junction, due to its internal structure. With a multilayer ceramic structure, the MLV can dissipate across many more junctions in its active area. This allows MLVs to be able to handle more energy than diodes and have a higher inrush current capability.

This internal structure also allows for a more even dissipation of energy and heat across the device, whereas the diode will create more heat in the smaller depletion zone. These structural differences create many advantages for MLVs, as seen below.

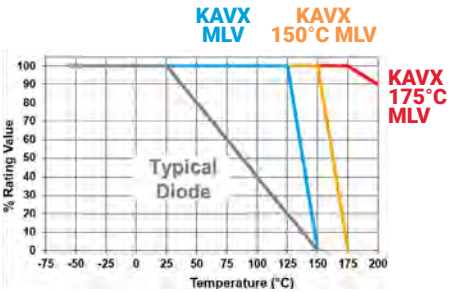
0805 Auto-Grade Varistor

SMAJ33CA Diode

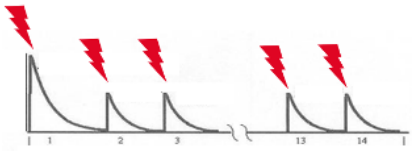


KYOCERA AVX VARISTOR ADVANTAGES

No Power Derating



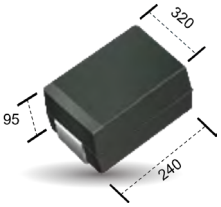
High Reliability



Multiple Strike Capability

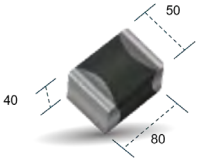
Size Reduction

Reduction of Board Space ~70-80%



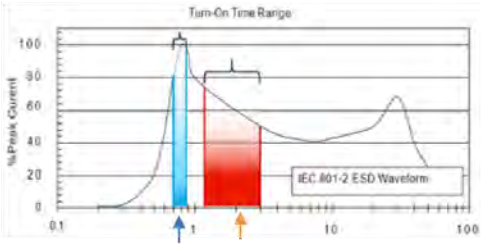
TVS DIODE

Dimensions (mil)



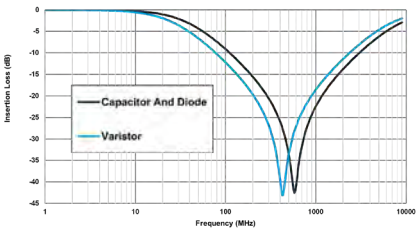
KAVX MLV

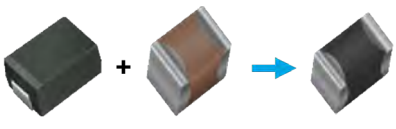
Faster Turn-On Time



TVS & EMI Filtering

S21 of Diode + MLCC (1206, 100pF) & 1206 MLV





TVS DIODE + EMC CAP → KAVX MLV

ENGINEERING SUPPORT AND CUSTOM SOLUTIONS

KYOCERA AVX's technical resources are prepared to review any specific requirements or custom designs for your TVS solution. Please contact KYOCERA AVX, your local representative, or any of our authorized distributors with questions.

SpiMLV

Online Simulation Catalog

WWW.KYOCERA-AVX 1 AVX Blvd. Fountain Inn, SC 29644 (864) 967-2150